



United States  
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Agriculture

Forest  
Service

Plumas  
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File Code: 2540

Date: December 17, 2004

Steve Rosenbaum  
California Regional Water Quality Control Board -  
Central Valley Region  
3443 Routier Road, Suite A  
Sacramento, CA 95827-3003

Dear Mr. Rosenbaum:

Please find attached two water quality monitoring reports by the U.S. Department of Agriculture, Forest Service, Plumas National Forest, for the Walker Mine Tailings in Plumas County. The reports are (1) Quarterly Monitoring Report for September 2004 and (2) the Annual Monitoring Report. All September water samples were transported to Henrici Water Laboratory near Quincy for analysis. The Henrici laboratory sent a portion of these samples to Cal Science laboratory in Garden Grove, California for metals analyses.

The 2001 Amended Record of Decision for the Walker Mine Tailings site provides for the diversion of Dolly Creek around the tailings material. The design for this diversion channel was completed by a consulting engineering firm in October 2004. Subsequently, a significant shortcoming has been discovered with this design and a revised design will be necessary. This revised design will be completed by September 2005. Negotiations with the Atlantic Richfield Company (ARCO), a Potentially Responsible Party, over remediation costs are still pending.

Please call Joe Hoffman of this office at (530) 283-7868 if you have questions.

*I certify under penalty of law that I have personally examined and am familiar with the information submitted in the attached documents and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.*

Sincerely,

*Elizabeth A. Taylor*

JAMES M. PEÑA  
Forest Supervisor

*for*

Enclosures

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## ANNUAL MONITORING REPORT

**Discharger:** USDA Forest Service, Plumas National Forest

**Facility:** Walker Mine Tailings, Plumas County

**Reporting Frequency:** Annual Summary

**Monitoring Period:** Calendar Year 2004

### **Findings:**

(1) Surface Water. Samples were collected during May, July and September. Adjusting for hardness at the compliance station on Little Grizzly Creek (R-5), the calculated limitation for dissolved copper for the three sampling periods ranged from 5.5 ug/L to 12.7 ug/L. This limitation was exceeded for the May and July samples (380 ug/L and 67 ug/L, respectively). The dissolved copper concentration of 380 ug/L measured in May was by far the highest concentration measured at R-5 throughout the 14 years of monitoring (the second highest was 140 ug/L, measured in July 1993). However, dissolved copper was not detected at all at R-5 for the September sample (detection limit equal to 1.00 ug/L). This concentration result is by far the lowest concentration measured at R-5 throughout the 14 years (the average concentration for the 39 previous samples is 46 ug/L).

Other atypical and curious results are observed for the May 2004 samples from R-3, the background station on Little Grizzly Creek, and R-4, Little Grizzly Creek above the confluence with Dolly Creek (see Table 1 and Map 1). The May dissolved copper concentration at R-3 of 3.4 ug/L is very typical for this site. However, the R-4 concentration of 42 ug/L is drastically high (the average copper concentration for the 68 samples collected at each of these two sites through 2003 was 3.2 ug/L at both R-3 and R-4). This increase from R-3 to R-4 would suggest that perhaps copper is being delivered to Little Grizzly Creek via ground water seeping through the tailings pile. However, the July and September results – as well as the results from the previous 13 years of monitoring data – do not support this hypothesis.

Copper concentrations were not detected at either R-3 or R-4 for both the July and September monitoring events. Such small concentrations are typical for these two sites and a review of the 68 copper testing events for R-3 and R-4 from 1991 to 2003 indicates no significant trend. The average dissolved copper concentration for the two sites over this period is strikingly similar (3.2 ug/L for both R-3 and R-4). Including 2004, copper concentrations above the laboratory detection limits were found in the waters of Little

Grizzly Creek above the confluence with Dolly Creek just 25% (R-3) and 28% (R-4) of the time. However, the concentrations found frequently do not follow the hypothesis that the copper concentration in Little Grizzly Creek is increasing as it flows past the tailings material. Only 17% of the sampling events show higher dissolved copper concentrations at R-4 than at R-3 and about half the time that copper is detected at R-3 it is not detected downstream at R-4.

Since management practices at these sites did not change prior to the May 2004 sampling event, it is our feeling that these curious and abnormal trends are not indicative of a significant change in water quality at the sites but are more a result of the inherent variability associated with metals concentrations measured in grab samples. This variability is particularly striking when one considers that the extremely large copper concentration of 380 ug/L at R-5 in May was measured in a sample taken on the same day that the R-2 sample (Dolly Creek below the tailings area) measured just 2.8 ug/L, the lowest concentration measured at R-2 over 14 years of monitoring. It is illogical that a mixture of the two copper concentrations measured from the May samples at R-2 and R-4 (2.8 ug/L and 42 ug/L), the sites located immediately upstream of the confluence of Dolly and Little Grizzly Creeks, would result in a concentration of 380 ug/L at R-5. This again points to the inherent variability of grab sample concentrations.

In two of the three sampling events, dissolved copper was found at R-1 (Dolly Creek above the tailings area) in concentrations that exceeded the limitations established for freshwater aquatic life protection (these concentrations measured 28, 21 and 7.8 ug/L). The results from the R-2 samples, Dolly Creek below the tailings area, again indicate the tailings area as the primary source of copper to the receiving waters. For the July and September sampling events, the average increase in copper concentration from R-1 to R-2 amounted to 88% of the copper found at R-2 (see Table 2 and Chart 1). The May event was again the curious exception as the copper concentration appeared to decline from 28 ug/L at R-1 to just 2.8 ug/L at R-2.

The reduction in copper concentrations between stations R-2 and the R-5 compliance station on Little Grizzly Creek – presumably due to dilution - was 70% in July, and practically 100% in September. The 2004 water year was considered to be well below average for precipitation and runoff; table 3 displays flow rates for the three sampling periods from 1991 through 2004.

The limitations for iron and zinc were not exceeded in any of the 15 surface water samples collected in 2004.

(2) Groundwater. Three monitoring wells (W-3, W-5, and W-7) were each sampled twice in 2004, in May and September (see Map 2). A summary of the test results of this year's sampling is compared to that performed in 1994 – 1995 and 2000 - 2003 (Table 4). All seven wells were sampled in 1994 and 1995 with four events in 1994 and two in 1995. The 2000, 2001, 2002 and 2003 testing schedules were identical to 2004 with wells W-3, W-5, and W-7 sampled in May and September.

The detection of dissolved copper or zinc is relatively rare in any of the wells. The most striking exceptions occurred at W-4 in August and September of 1994 when copper concentrations of 550 and 620 ug/L were measured. A smaller amount of dissolved copper (12 ug/L) was found in 2001 in W-3 sample but no dissolved copper or zinc was found in any of the other 2001 well samples. Similarly, no dissolved copper or zinc was found in the 2000 samples. For 2002, dissolved copper was detected in 3 of the 6 well samples with a maximum concentration of just 2.1 ug/L. For 2003, dissolved copper was detected in 5 of the 6 well samples with a maximum concentration of 2.8 ug/L. Similarly, in 2004, dissolved copper was again found in 5 of the 6 wells samples with a maximum concentration of 2.4 ug/L. Dissolved zinc concentrations were detected in five of the six well samples in 2004 with a maximum concentration of 9.0 ug/L.

Test results for total copper and zinc in the 1994 and 1995 samples indicate that these metals are present in the tailings material throughout the site. The characterization of the tailings material in 1992 by Westec confirmed the presence of these constituents throughout the tailings area. The characterization program included not only the seven monitoring wells, but also an additional seven boreholes.

One can basically conclude that even though copper and zinc are present in the tailings material throughout the site, they are not entering into solution (except along the Dolly Creek channel). This is evident in the similarity of copper concentrations measured in the 3 wells sampled in 2000 - 2004 (all less than 2.8 ug/L). Therefore, the hypothetical trend of increasing copper concentration from the background well, W-7, as groundwater seeps through the tailings to wells W-3 and W-5 is not supported by the copper data. This is further confirmed by the surface water-sampling program, in which samples taken at the base of the tailings in Little Grizzly Creek (R-4) generally indicate that these constituents are at non-detectable levels. It's only after Little Grizzly Creek mixes with Dolly Creek that soluble copper and zinc are detected.

The water level in each well was measured in 2003 during both sampling events, May and September. A map displaying the groundwater flow gradient and direction was produced for each event (Maps 3 and 4). Generally, the groundwater in the tailings area drains in two directions, towards the tailings dam near the end of Dolly Creek and towards the settling pond near R-6. The groundwater gradient increases by the end of the summer season, dropping nearly five feet at the dam and ten feet at the settling pond.

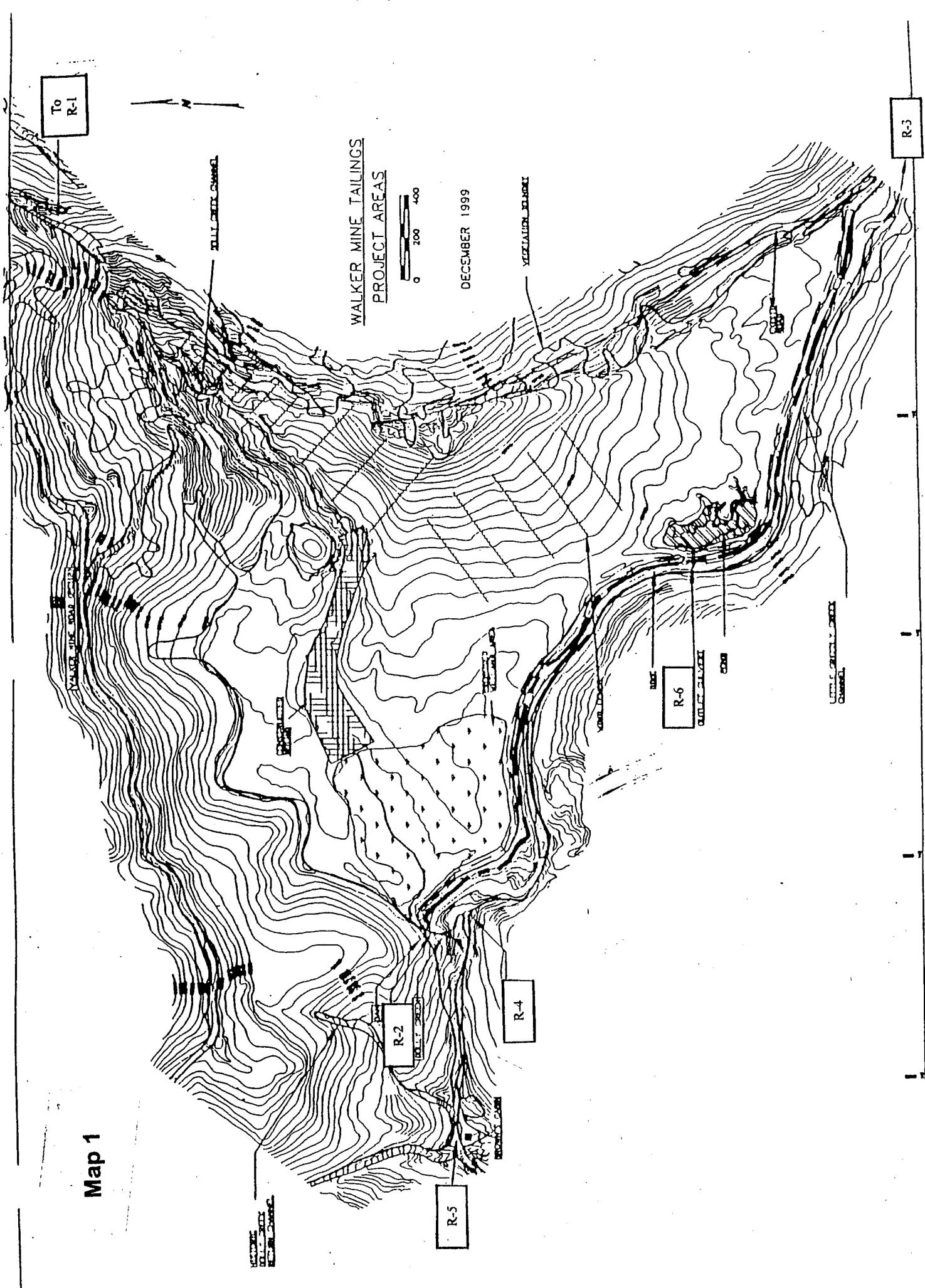
Table 5 lists the measured groundwater depths for the years in which this data has been collected (1993 – 1995 and 2000 - 2004). Groundwater elevations at W-3 are important to look at from the standpoint of the proposed anaerobic wetland. The depth to water in 2004 increased from 4.5 feet to 6.3 feet from May to September. The depth to groundwater at W-3 averages 5.5 feet and the seasonal water table drop is typically about two feet. Except for the driest year since monitoring began, water appears to flow over the tailings dam at all times; in August 1992, Dolly Creek flows did not reach the tailings dam during the heat of the day.

(3) Channel Substrate Analysis (Pebble Count). One of the measured changes that should occur as a result of rehabilitating the tailings area is a decreased transport of tailings material to Little Grizzly Creek. Though most of the material moves during times of high flows when sampling does not normally occur, evidence of its occurrence should be measurable by analyzing channel substrate size classes. In past years, a "Wolman pebble count" has been conducted once a year in the fall to analyze the channel substrate.

Unfortunately, significant October snowstorms in 2004 prevented access to the Walker Mine Tailings site much earlier in the field season than typical. Therefore, the pebble counts at the two established pebble count transects were not monitored in 2004.

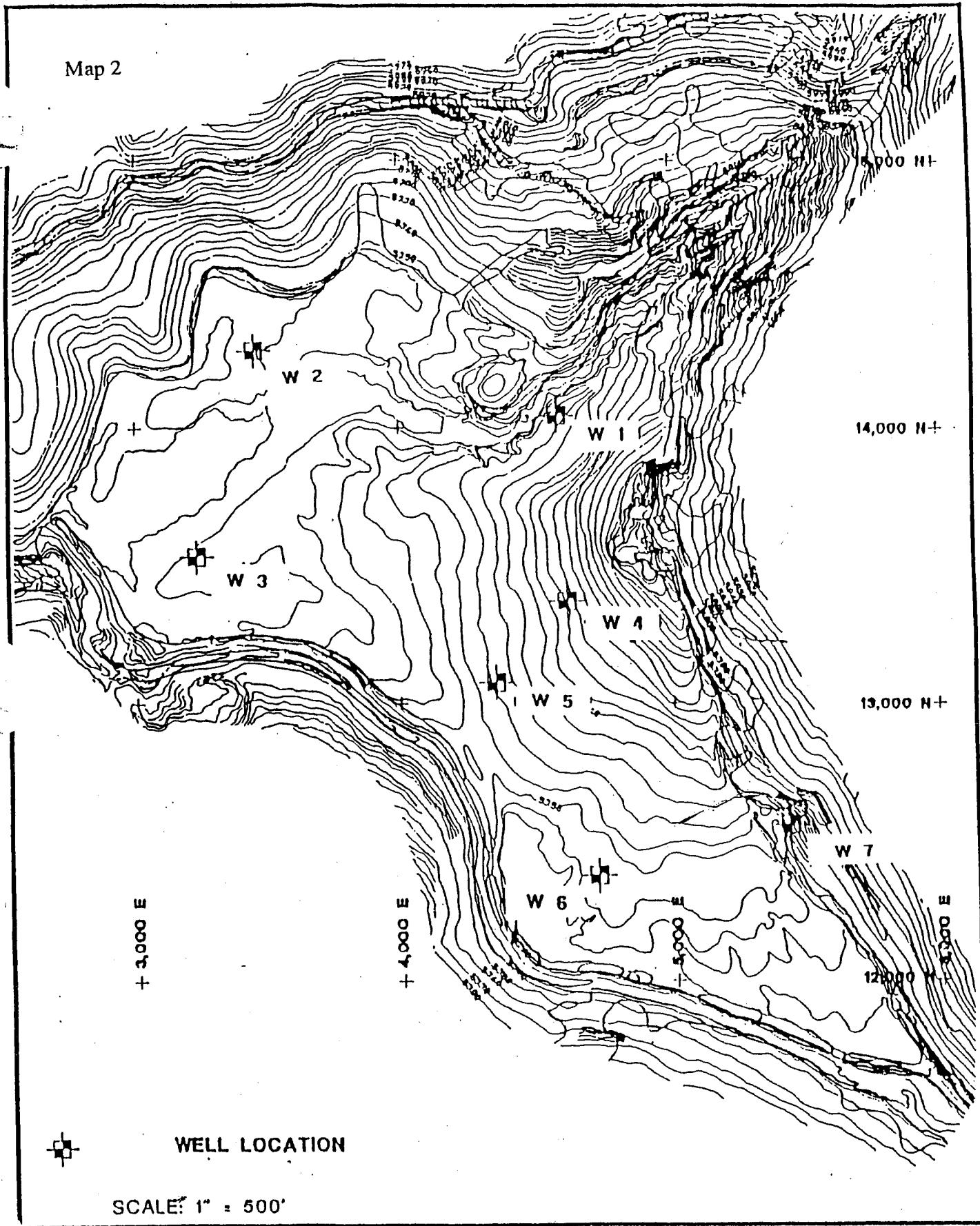
Pebble count data for the previous four years (2000-2003) exhibited very similar results: the R-5 transect (on Little Grizzly Creek below its confluence with Dolly Creek) did contain sand-sized material, including the medium, fine and very fine sands found over most of the tailings area, whereas the R-6 (on Little Grizzly Creek above its confluence with Dolly Creek) transect did not. Based on the data collected and visible evidence made at the time the transects were established, most of the sands are being washed downstream during winter and spring flows, but material from the tailings area apparently continues to wash into Little Grizzly Creek for an extended period of time and some of it is trapped around the coarser material of the R-5 channel section.

**Map 1**



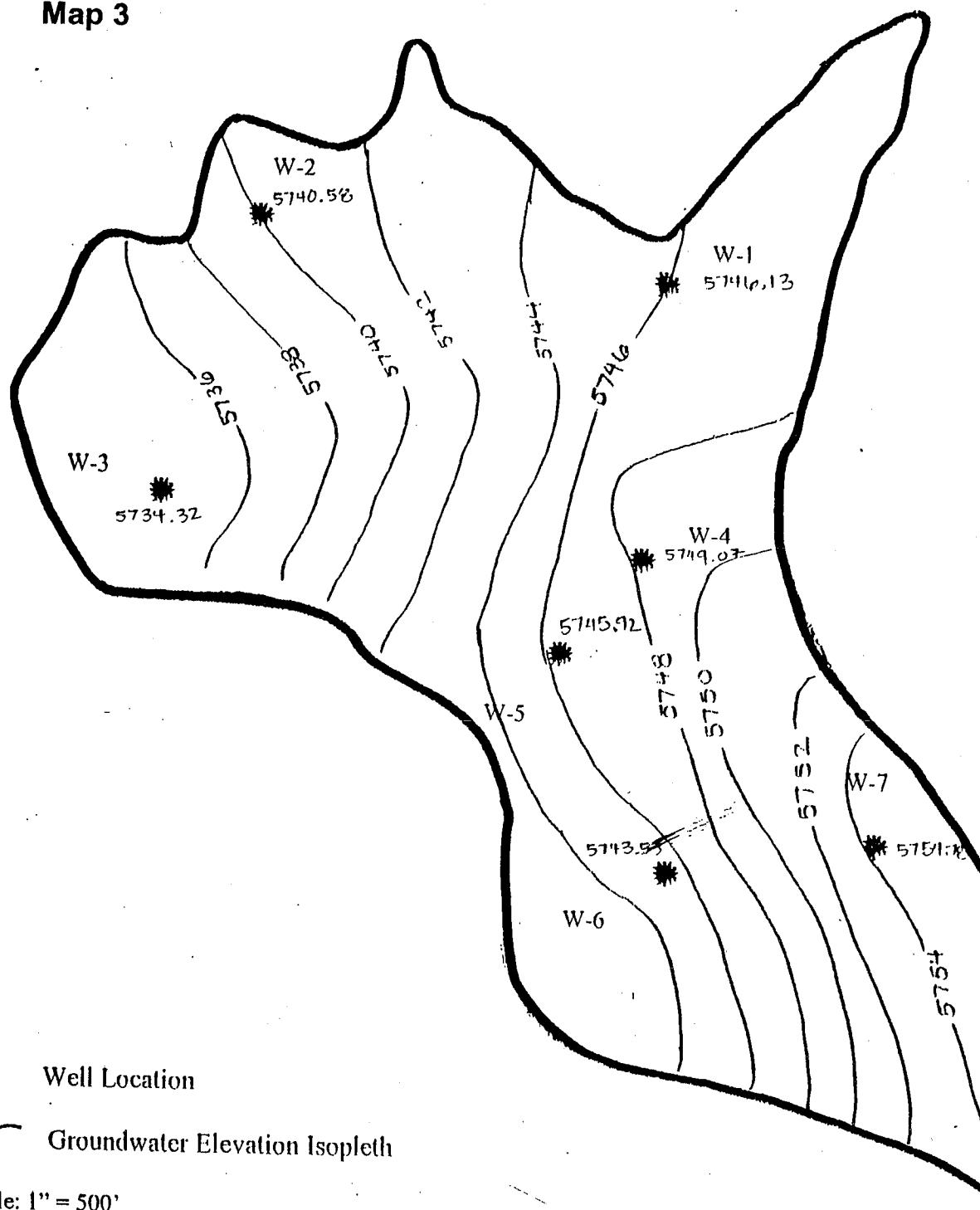
11502 1 7/93 .11

Map 2

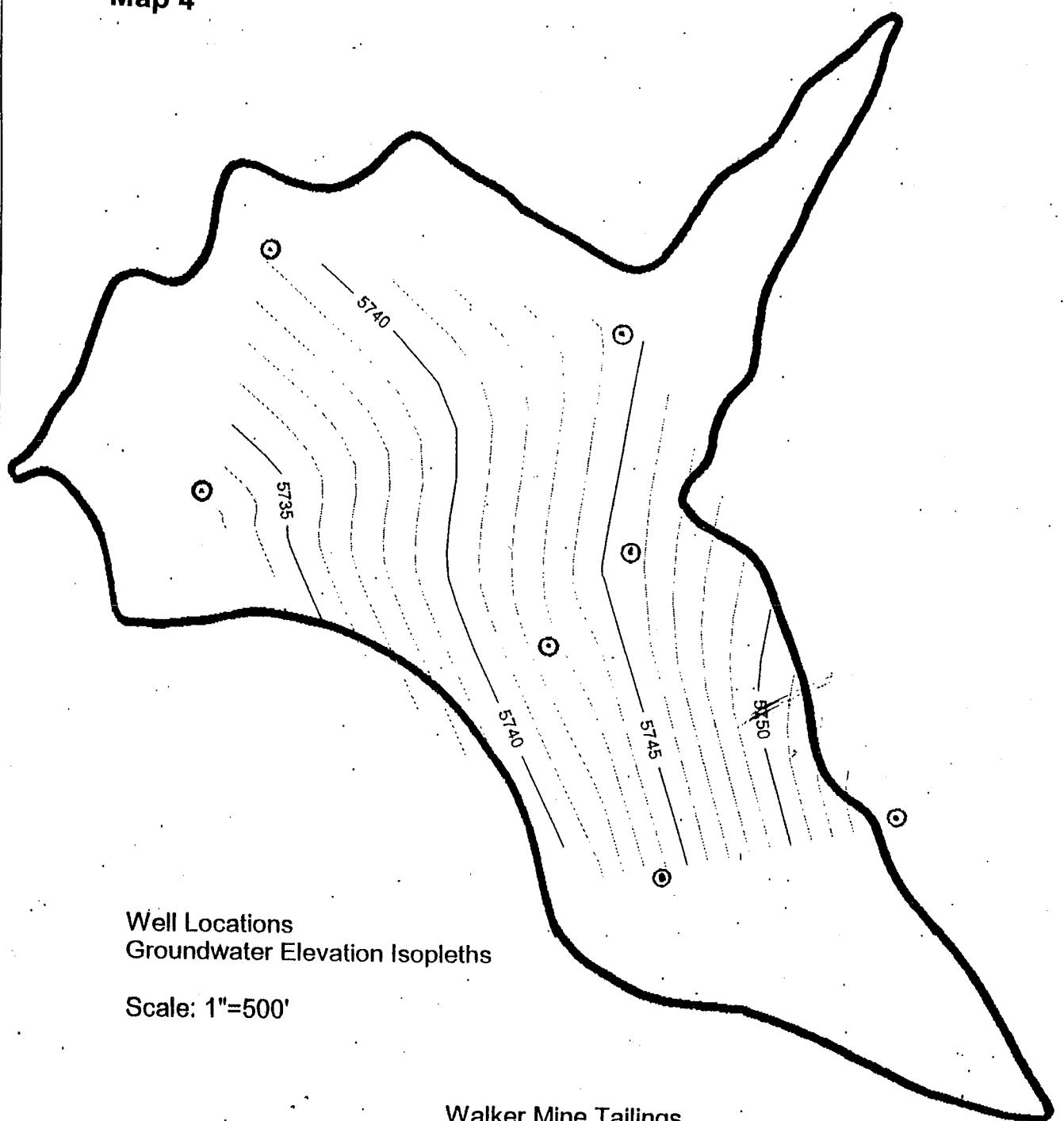


WALKER MINE TAILINGS

**Map 3**



Walker Mine Tailings  
Groundwater Contour Map  
May 2004

**Map 4**

**Well Locations  
Groundwater Elevation Isopleths**

Scale: 1"=500'

**Walker Mine Tailings  
Groundwater Contour Map**

**September 2003**

**Copper Concentrations at R-3 and R-4  
Little Grizzly Creek Above and Below Walker Tailings**

Table 1

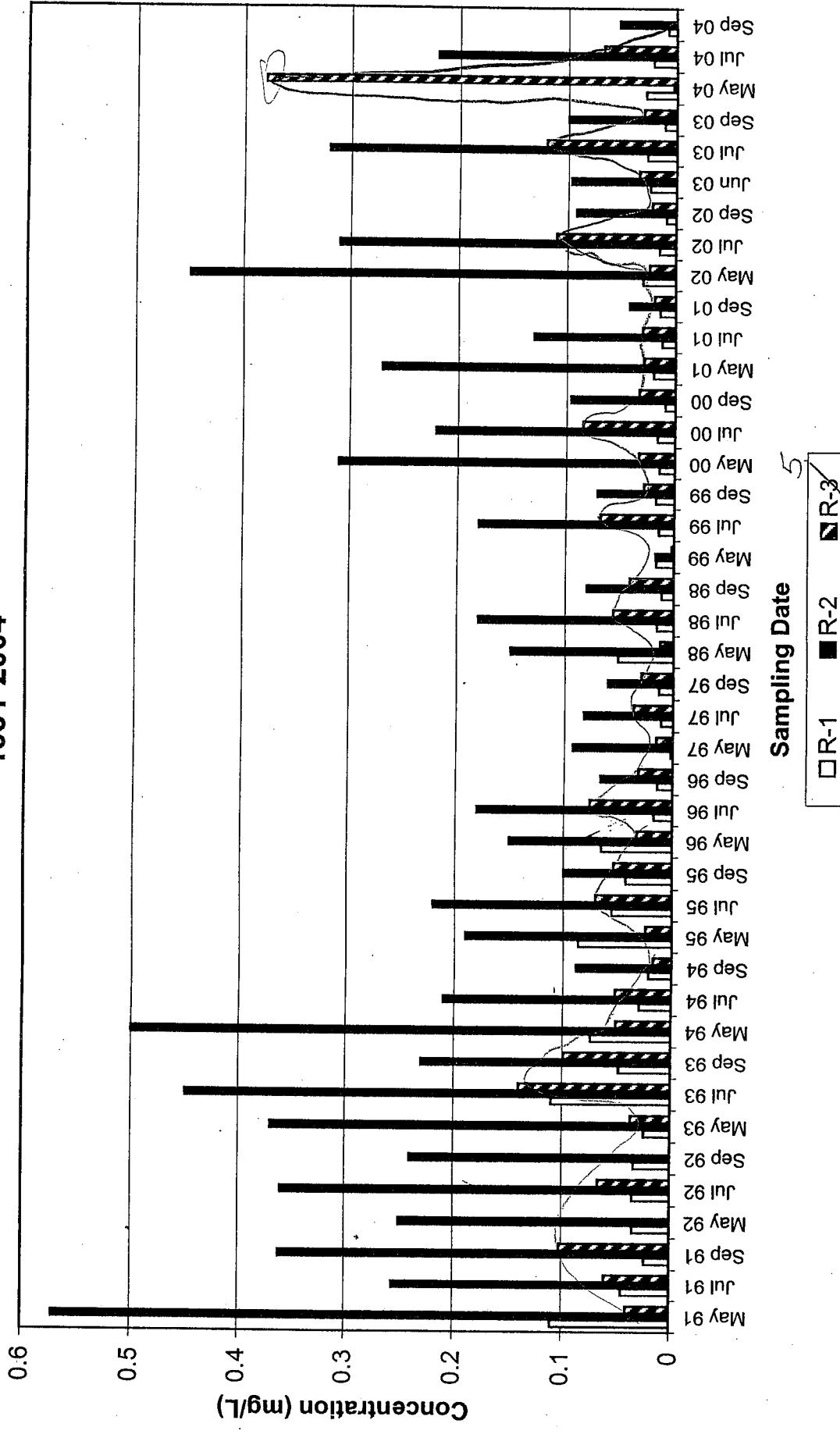
Date	R-3 Copper mg/L	R-4 Copper mg/L	Date	R-3 Copper mg/L	R-4 Copper mg/L
May 91	0	0.0020	May 00	0	0
Jun 91	0	0	Jul 00	0.0230	0
Jul 91	0	0	Sep 00	0	0
Aug 91	0	0.0030	May 01	0	0
Sep 91	0	0	Jul 01	0	0
Oct 91	0	0	Sep 01	0	0
Nov 91	0	0	May 02	0.0051	0
Dec 91	0	0.0030	Jul 02	0.0039	0.0013
Apr 92	0	0	Sep 02	0	0.0037
May 92	0	0.0390	June 03	0.0017	0.0013
Jun 92	0.0039	0	Jul 03	0	0.0027
Jul 92	0	0	Sep 03	0.0032	0.0010
Aug 92	0.0036	0	May-04	0.0034	0.0420
Sep 92	0.1200	0.1200	Jul-04	0	0
Oct 92	0	0.0024	Sep-04	0	0
Nov 92	0	0			
May 93	0	0	x	0.0031	0.0037
Jun 93	0.0028	0	n	71	71
Jul 93	0.0024	0.0070	s	0.0148	0.0152
Aug 93	0	0	max	0.1200	0.1200
Sep 93	0	0.0083	min	ND	ND
Oct 93	0	0			
Nov 93	0	0.0040			
May 94	0	0			
Jun 94	0.0090	0.0057			
Jul 94	0	0			
Aug 94	0	0			
Sep 94	0	0			
Oct 94	0	0			
Jun 95	0	0			
Jul 95	0	0			
Aug 95	0.0041	0			
Sep 95	0	0			
Oct 95	0	0			
Nov 95	0	0.0023			
May 96	0	0			
June 96	0	0			
July 96	0.0029	0			
Aug 96	0.0022	0			
Sept 96	0	0			
May 97	0	0			
June 97	0	0			
July 97	0	0			
Aug 97	0	0			
Sept 97	0	0			
Oct 97	0	0			
June 98	0	0			
July 98	0.0110	0.0034			
Aug 98	0.0046	0.0015			
Sept 98	0	0			
Oct 98	0.0130	0.0088			
Jun 99	0	0			
Jul 99	0	0			
Aug 99	0	0			
Sept 99	0	0			
Oct 99	0	0			

**Summary of Copper Data for R-1, R-2 and R-5**  
**1991-2004**

**Table 2**

Year	R-1 Cu Conc. (mg/L)			R-2 Cu Conc. (mg/L)			R-5 Cu Conc. (mg/L)		
	May/June	July	September	May/June	July	September	May/June	July	September
1991	0.110	0.044	0.023	0.572	0.256	0.362	0.040	0.060	0.102
1992	0.034	0.034	0.033	0.250	0.360	0.240	0.000	0.066	0.000
1993	0.024	0.110	0.047	0.370	0.450	0.230	0.036	0.140	0.099
1994	0.074	0.029	0.021	0.500	0.210	0.088	0.050	0.051	0.017
1995	0.086	0.055	0.042	0.190	0.220	0.100	0.024	0.070	0.053
1996	0.065	0.017	0.014	0.150	0.180	0.066	0.032	0.076	0.031
1997	0.002	0.011	0.013	0.092	0.082	0.060	0.015	0.036	0.029
1998	0.050	0.015	0.011	0.150	0.180	0.080	0.012	0.055	0.040
1999	0.016	0.014	0.017	0.017	0.180	0.071	0.002	0.068	0.028
2000	0.014	0.016	0.009	0.310	0.220	0.096	0.033	0.085	0.033
2001	0.020	0.012	0.014	0.270	0.130	0.042	0.029	0.030	0.019
2002	0.030	0.015	0.009	0.450	0.310	0.092	0.024	0.110	0.022
2003	0.024	0.027	0.011	0.097	0.320	0.100	0.034	0.120	0.030
2004	0.028	0.021	0.008	0.003	0.220	0.052	0.380	0.067	0.000
	x	0.04	0.03	0.02	x	0.24	0.12	x	0.05
	n	14	14	n	14	14	n	14	14
	s	0.03	0.03	0.01	s	0.18	0.10	s	0.10
max	0.110	0.110	0.047	max	0.572	0.450	max	0.380	0.030
min	0.002	0.011	0.008	min	0.003	0.082	min	ND	ND

**Chart 1**  
**Copper Concentrations at R-1, R-2, & R-5**  
**Dolly Creek and Little Grizzly Creek**  
**1991-2004**



**Summary of Flow Rates at R-1, R-2 and R-5**  
**1991-2004**

**Table 3**

**R-1 Flow Rate (cfs)**

Year	May/June	July	September	May/June	July	September	May/June	July	September
1991	0.88	0.52	0.60	1.28	0.31	0.28	19.62	0.84	1.35
1992	0.18	0.14	0.11	0.12	0.06	0.02	1.06	0.43	0.22
1993	7.28	1.31	0.73	7.28	1.25	0.57	46.10	3.53	1.10
1994	0.31	0.14	0.14	0.72	0.15	0.01	7.30	0.45	0.44
1995	6.97	2.48	1.05	8.22	2.38	2.01	97.20	7.46	1.88
1996	12.30	1.10	0.90	15.60	1.30	1.00	80.90	3.40	1.70
1997	5.05	1.24	0.66	5.69	1.18	0.86	54.09	1.43	1.34
1998	9.60	1.80	1.00	10.20	2.00	0.90	120.00	7.10	2.10
1999	5.24	1.30	0.78	5.74	1.13	0.72	34.97	3.74	1.35
2000	2.00	0.70	0.40	2.20	0.70	0.40	23.40	2.10	1.00
2001	0.44	0.18	0.24	0.42	0.13	0.28	3.99	0.52	0.73
2002	1.25	0.37	0.34	1.62	0.31	0.18	18.13	1.12	0.56
2003	3.41	0.77	0.45	3.78	0.75	0.38	22.05	1.67	1.20
2004	1.37	0.14	0.07	1.29	0.34	0.08	13.39	1.99	0.23
x	4.02	0.87	0.53	x	4.58	0.86	x	38.73	2.56
n	14	14	14	n	14	14	n	14	14
s	3.84	0.71	0.33	s	4.51	0.72	s	36.86	2.29
max	12.30	2.48	1.05	max	15.60	2.38	max	120.00	7.46
min	0.18	0.14	0.07	min	0.12	0.06	min	1.06	0.43

**GROUNDWATER QUALITY AT WALKER MINE TAILINGS**  
**1994-2004**

Table 4

Well No.	Sample Date	Copper		Iron		Zinc	
		Total (mg/L)	Filtered (mg/L)	Total (mg/L)	Filtered (mg/L)	Total (mg/L)	Filtered (mg/L)
W-3	07/18/1994	0.02	-	1.4	-	ND	-
W-3	08/24/1994	0.02	ND	1.4	ND	ND	ND
W-3	09/22/1994	ND	ND	0.73	0.17	ND	ND
W-3	10/25/1994	ND	ND	1.1	0.70	ND	ND
W-3	06/24/1995	ND	ND	1.6	ND	ND	ND
W-3	11/13/1995	ND	ND	0.36	0.04	ND	ND
W-3	05/24/2000	-	ND	-	0.021	ND	ND
W-3	09/13/2000	-	ND	-	ND	ND	ND
W-3	05/22/2001	-	ND	-	ND	-	ND
W-3	09/25/2001	-	0.012	-	ND	-	ND
W-3	05/10/2002	-	ND	-	ND	-	ND
W-3	09/26/2002	-	0.0021	-	ND	-	ND
W-3	05/23/2003	-	0.0020	-	ND	-	ND
W-3	09/18/2003	-	0.0025	-	ND	-	0.0032
W-3	05/21/2004	-	0.0015	-	ND	-	ND
W-3	09/05/2004	-	0.0024	-	0.062	-	0.062
					ND	-	0.0016
W-4	08/24/1994	0.89	0.55	93	0.41	0.08	0.04
W-4	09/22/1994	1.7	0.62	120	0.41	0.15	0.05
W-4	10/25/1994	0.98	ND	100	32	0.12	ND
W-4	06/24/1995	ND	ND	28	28	ND	ND
W-4	11/13/1995	ND	ND	47	25	ND	ND
W-5	07/18/1994	0.11	-	32	-	ND	-
W-5	08/24/1994	0.04	ND	31	0.1	ND	ND
W-5	09/22/1994	0.05	ND	30	ND	ND	ND
W-5	10/25/1994	0.06	ND	32	2.2	ND	ND
W-5	06/24/1995	ND	ND	2.5	1.9	ND	ND
W-5	11/13/1995	ND	ND	17	0.15	ND	ND
W-5	05/24/2000	-	ND	-	0.068	ND	ND
W-5	09/13/2000	-	ND	-	0.74	ND	ND
W-5	05/22/2001	-	ND	-	1.2	-	ND
W-5	09/25/2001	-	ND	-	ND	-	ND
W-5	05/10/2002	-	ND	-	0.14	-	ND
W-5	09/26/2002	-	0.0013	-	0.12	-	ND
W-5	05/23/2003	-	0.0015	-	ND	-	ND
W-5	09/18/2003	-	0.0028	-	ND	-	ND
W-5	05/21/2004	-	0.0012	-	ND	-	0.0056
W-5	09/05/2004	-	0.0011	-	ND	-	0.0054
					ND	-	ND
W-6	08/24/1994	0.46	ND	14	ND	0.04	ND
W-6	09/22/1994	0.99	0.01	31	0.69	0.08	ND
W-6	10/25/1994	0.72	0.01	23	0.27	0.02	ND
W-6	06/24/1995	ND	ND	ND	ND	ND	ND
W-6	11/13/1995	0.09	ND	3.9	0.06	ND	ND
W-7	07/18/1994	ND	ND	1.9	-	0.02	-
W-7	08/24/1994	0.02	ND	30	0.45	0.05	ND
W-7	09/22/1994	0.04	ND	43	0.96	0.07	ND
W-7	10/25/1994	0.04	ND	52	1.1	0.06	ND
W-7	06/24/1995	ND	ND	ND	ND	ND	ND
W-7	11/13/1995	0.01	ND	14	0.67	0.02	0.01
W-7	05/24/2000	-	ND	-	0.079	-	ND
W-7	09/13/2000	-	ND	-	0.18	-	ND
W-7	05/22/2001	-	ND	-	0.14	-	ND
W-7	09/25/2001	-	ND	-	ND	-	ND
W-7	05/10/2002	-	ND	-	0.28	-	ND
W-7	09/26/2002	-	0.0021	-	0.10	-	0.0034
W-7	05/23/2003	-	0.0010	-	ND	-	0.0034
W-7	09/18/2003	-	ND	-	ND	-	0.0039
W-7	05/21/2004	-	0.0023	-	ND	-	0.0090
W-7	09/05/2004	-	ND	-	ND	-	0.0049

**Table 5**

**Groundwater Depths at Walker Mine Tailings**  
**1993 - 2004**

Depth to Groundwater From Top of Casing	Monitoring Well Number: Depth to Water (ft)						<u>Average Depth (ft)</u>
	<u>W-1</u>	<u>W-2</u>	<u>W-3</u>	<u>W-4</u>	<u>W-5</u>	<u>W-6</u>	
5729.24	5741.74	5738.83	5768.00	5754.09	5747.87	5754.91	5754.91
07-17-1993	13.34	2.14	5.12	16.96	7.90	5.64	1.06
07-18-1994	15.06	3.00	6.11	23.43	11.94	6.74	7.45
08-24-1994	15.35	3.26	6.59	24.52	12.88	7.63	9.71
09-22-1994	15.49	2.94	6.62	25.25	13.46	8.14	10.33
10-25-1994	15.59	2.60	6.28	25.90	13.97	8.33	10.56
06-24-1995	11.17	0.86	3.76	11.61	4.43	3.33	10.65
11-13-1995	14.75	2.34	5.98	22.64	11.32	7.09	5.04
05-24-2000	12.54	0.95	4.22	16.58	6.62	3.73	9.31
09-13-2000	14.80	2.77	6.08	22.76	11.34	7.09	6.42
05-22-2001	14.06	1.61	4.89	21.88	10.26	5.05	9.30
09-25-2001	15.27	3.16	6.69	25.21	13.39	8.25	8.33
05-10-2002	13.18	0.94	4.02	19.56	8.35	3.73	10.52
09-26-2002	14.96	2.92	6.40	24.37	12.59	7.87	7.19
05-23-2003	12.45	-	0.68	3.86	16.86	6.39	1.43
09-18-2003	14.54	2.58	6.08	22.84	11.35	7.16	10.08
05-21-2004	13.11	1.16	4.51	18.93	8.17	4.34	6.28
09-05-2004	14.57	2.63	6.30	23.52	11.89	7.44	9.33
Average Depth	14.13	2.15	5.50	21.34	10.37	6.19	9.65
n	17	17	17	17	17	17	8.67
s	1.28	0.91	1.07	3.96	2.86	1.82	1.75
max	15.59	3.26	6.69	25.90	13.97	8.33	10.65
min	11.17	0.68	3.76	11.61	4.43	3.33	5.04

## MONITORING REPORT

**Discharger:** USDA Forest Service, Plumas National Forest

**Facility:** Walker Mine Tailings, Plumas County

**Reporting Frequency:** Quarterly

**Monitoring Period:** September 2004

### **Findings:**

(1) Surface water. Samples were collected September 5, 2004. Results from the surface water sample collected at the compliance station, R-5, Little Grizzly Creek near Brown's Cabin, are in noncompliance with all of the prescribed limitations - including copper - as highlighted in Table 1. Of the 15 surface water samples collected at the compliance station since 2000, this is the first sample to have a copper concentration within the prescribed limitation. The copper concentration at R-1 measured roughly 60% of the limitation, while the release of copper from the tailings area to Dolly Creek, as measured at R-2, is more than 4 times the limitation. Concentrations of zinc were detected in the samples taken at 2 of the 5 sites but neither of these concentrations exceeded the order's limitation for zinc. The concentration of iron, highest at R-2, does not exceed the limitation at any of the stations.

(2) Groundwater. Table 2 summarizes the findings for groundwater samples collected from the site. Small concentrations of dissolved copper ( $\leq 2.37 \text{ ug/L}$ ) were found in two of the three prescribed sampling wells (W-3 and W-5). Concentrations of dissolved iron were not detected in any of the three wells. Small concentrations of dissolved zinc were found in W-3 and W-7.

Groundwater elevations were measured in all seven wells installed at the site. The results show a definite water table gradient towards Little Grizzly Creek of approximately 0.9% along the Dolly Creek channel and approximately 1.2% to the settling pond (R-6). With the elevation of the Little Grizzly Creek channel approximately 20 feet below the surface of the tailings area, there is a strong gradient towards Little Grizzly Creek all along its course with the tailings area. Evidence of this flow is the almost continuous line of seeps along the base of the tailings area and the channel bank.

(3) Pebble Count. Significant October snowstorms in 2004 prevented access to the Walker Mine Tailings site much earlier in the field season than typical. Therefore, the pebble counts at the two established pebble count transects were not monitored in 2004.

Pebble count data for the previous four years (2000-2003) exhibited very similar results: the R-5 transect (on Little Grizzly Creek below its confluence with Dolly Creek) did contain sand-sized material, including the medium, fine and very fine sands found over most of the tailings area, whereas the R-6 (on Little Grizzly Creek above its confluence with Dolly Creek) transect did not. Based on the data collected and visible evidence made at the time the transects were established, most of the sands are being washed downstream during winter and spring flows, but material from the tailings area apparently continues to wash into Little Grizzly Creek for an extended period of time and some of it is trapped around the coarser material of the R-5 channel section.

## **TABLE OF CONTENTS**

### **Table 1. SURFACE WATER SUMMARY**

Map of the tailings area with the surface water monitoring sites

Discharge Measurement Notes

Chain-Of-Custody record for surface water samples

Henrici Water Laboratory Analysis Reports for surface water tests

### **Table 2. GROUND WATER SUMMARY**

Map of the tailings area with the ground water monitoring sites

Map of tailings area with ground water elevations and flow direction

Water Level Data

Groundwater Monitoring, Water Sampling Field Data Sheet

Chain-Of-Custody record for ground water samples

Henrici Water Laboratory Analysis Reports for ground water tests

**SEPTEMBER 2004**

**SURFACE WATER TEST RESULTS  
AND  
SUPPORTING DOCUMENTATION**

## Table 1. SURFACE WATER SUMMARY REPORT

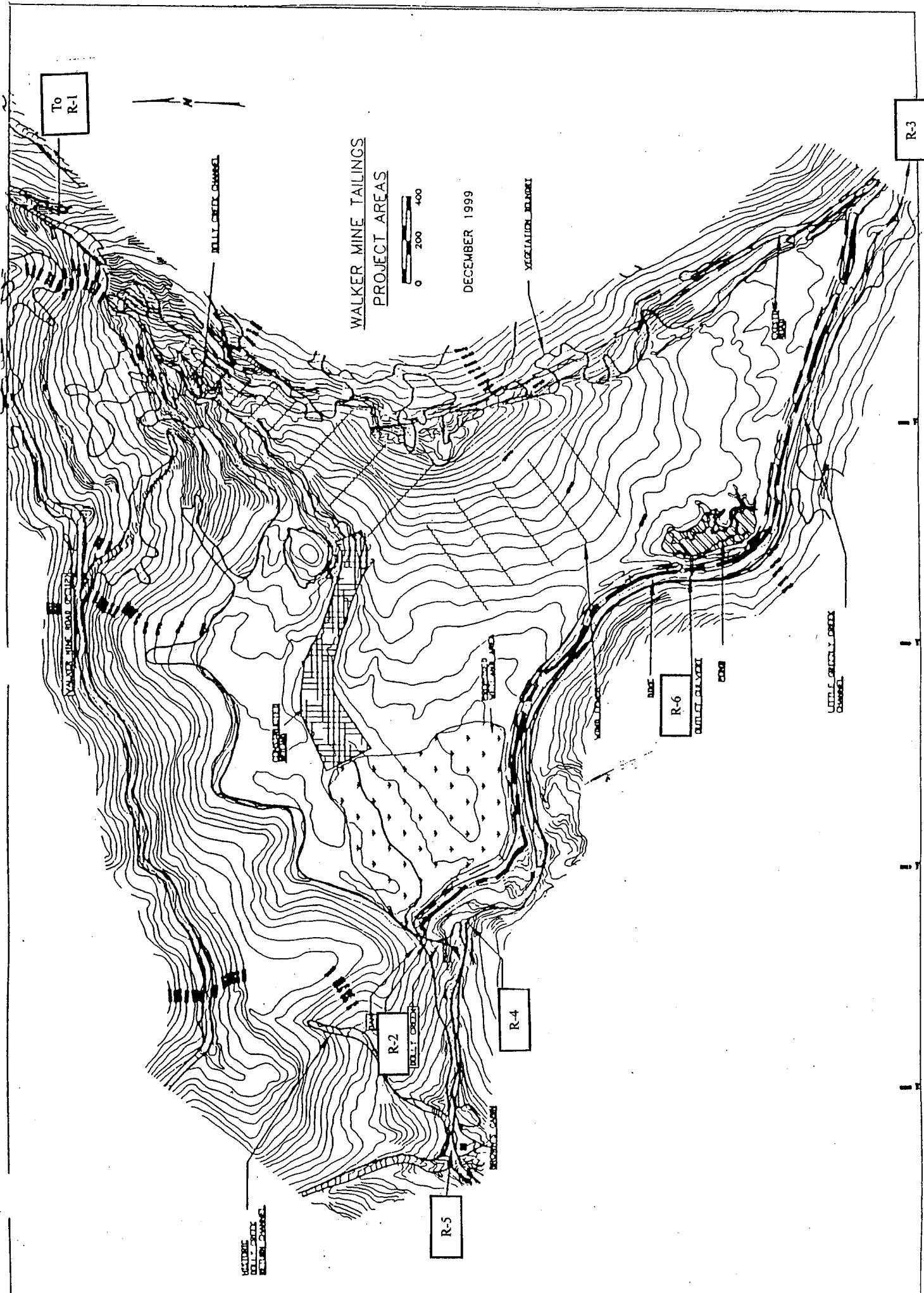
**MONITORING AND REPORTING PROGRAM No. 5-00-028**  
**U.S. DEPARTMENT OF AGRICULTURE, FOREST SERVICE, PLUMAS NATIONAL FOREST**  
**WALKER MINE TAILINGS, PLUMAS COUNTY**  
**SEPTEMBER 2004**

CONSTITUENT Field Parameters	UNITS	DETECTION LIMITS		MONITORING STATIONS			R-6	LIMITATION @ R-5 <sup>3</sup>
		R-2	R-1	R-3 <sup>1</sup>	R-4	R-5 <sup>2</sup>		
Flow	cfs	N/A	0.07	0.08	0.06	0.16	0.23	0
pH	number	N/A	7.87	8.08	7.89	7.59	8.18	N/A
Specific Conductance	umhos/cm	N/A	107	132	103.4	141	139	N/A
Air Temperature	°C	N/A	24.4	24.4	23.9	21.1	25.0	N/A
Water Temperature	°C	N/A	11.7	16.9	15.4	12.2	14.2	N/A
<u>Laboratory</u>								
Total Hardness as CaCO <sub>3</sub>	mg/l	2	110	120	100	120	150	N/A
Total Alkalinity	mg/l	1	65	75	66	75	77	N/A
Sulfate	mg/l	0.5	9.4	3.9	1.6	17.7	13.0	N/A
Turbidity	NTU	0.05	2.5	2.6	1.8	2.1	1.8	N/A
Dissolved Iron	ug/l	50	176	247	ND	91.8	ND	2.8
Dissolved Copper	ug/l	1.00	7.82	51.7	ND	ND	ND	1000
Dissolved Zinc	ug/l	1.00	ND	6.32	1.93	ND	ND	12.7
						166	ND	N/A

<sup>1</sup> R-3 is the background station located above the tailings area on Little Grizzly Creek.

<sup>2</sup> R-5 is the compliance station located near Brown's Cabin, downstream from the confluence of Dolly Creek with Little Grizzly Creek.

<sup>3</sup> The compliance values for copper and zinc are calculated with the R-5 hardness value of 150 mg/l as CaCO<sub>3</sub>.



**WALKER MINE TAILINGS MONITORING PROGRAM**

9-275 (May 1971) **UNITED STATES** **DEPARTMENT OF THE INTERIOR** **GEOLOGICAL SURVEY**

**WATER RESOURCES DIVISION**

**DISCHARGE MEASUREMENT NOTES**

**Site No. R-1**

**DOLLY Creek above Tailings @ Road 112**

**203 Party Link**

**Date 9/3 Width Area Vel. C. H. Ditch. No. sec. C. H. change in hrs. Sup.**

**Method 610 Method coef. Hor. angle coef. Sup. coef. Meter No.**

**C.G.C. READINGS Type of meter 111C**

**Time Recorder Inside Outside Date rated**

**Meter ft. above bottom of weight. Spin before meas. after**

**Meas. plots % diff. from rating**

**Wading, able, ice, boat, upstr., downstr., side bridge feet, mile, above, below gage, and**

**Check-bar, found changed at**

**Correct Levels obtained**

**Weighted M. C. H. G. H. correction. Correct M. C. H.**

**Measurement rated excellent (27% good (5%) fair (8%), poor (over 8%), based on following conditions: Cross section**

**Flow Other Cage Observer Control**

**Weather warm/ clear Air Temp @ 140° Water 11.7 °C @ 140° Intake flushed**

**Record removed Intake flushed**

**Control**

**PH 7.87 C. H. at zero flow**

**CONDUCTANCE 107 umhos/cm Samples @ 1412**

		River No.		Velocity		Adjusted angle or area		Area		Discharge	
		Dist. from initial point	Width	Depth	Flow rate cu. yds. sec.	Area	Mean area	Area	Mean area	Area	Discharge
LB	7										
1.5	.7										
2	.25										
2.5	.25										
3	.3										
3.5	.25										
4	.1										
RB	.07										
4.4											

**Scanses @ 1412**





WALKER MINE TAILINGS MONITORING PROGRAM

(May 1971)

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY

WATER RESOURCES DIVISION

DISCHARGE MEASUREMENT NOTES

See No. R-4

Little Grizzly Creek below Tailings

Date 9/5 Party Flynn

Width Area \_\_\_\_\_ Vel \_\_\_\_\_ C. H. \_\_\_\_\_ Ditch. \_\_\_\_\_

Method #10 No. sec. \_\_\_\_\_ C. H. change \_\_\_\_\_ in \_\_\_\_\_ hr. Sup. \_\_\_\_\_

Method coef. \_\_\_\_\_ Hor. angle coef. \_\_\_\_\_ Susp. coef. \_\_\_\_\_ Meter No. \_\_\_\_\_

CAGE READINGS Type of meter M.M.C.

Time Recorder Inside Outside Date rated \_\_\_\_\_ for rod, other. \_\_\_\_\_

Meter \_\_\_\_\_ ft. above bottom of weight. \_\_\_\_\_

Spin before meas. \_\_\_\_\_ after \_\_\_\_\_

Meas. plots \_\_\_\_\_ % diff. from rating \_\_\_\_\_

Wading cable, ice, boat, upstr., downstr., side bridge \_\_\_\_\_ feet, mile, above, below gage, and \_\_\_\_\_

Check-bar, sound \_\_\_\_\_ changed to \_\_\_\_\_ at \_\_\_\_\_

Weighted M. G. H. \_\_\_\_\_ Correct \_\_\_\_\_

C. H. correction \_\_\_\_\_ Correct \_\_\_\_\_

Correct M. C. H. \_\_\_\_\_ Levels obtained \_\_\_\_\_

Measurement rated excellent (2%), good (5%), fair (8%), poor (over 8%). based on following conditions: Cross section \_\_\_\_\_

Flow \_\_\_\_\_ Weather Cloudy / Cloudy \_\_\_\_\_

Other \_\_\_\_\_ Air 70 F 1242 \_\_\_\_\_

Cage \_\_\_\_\_ Water 12.2 °C @ 1240 \_\_\_\_\_

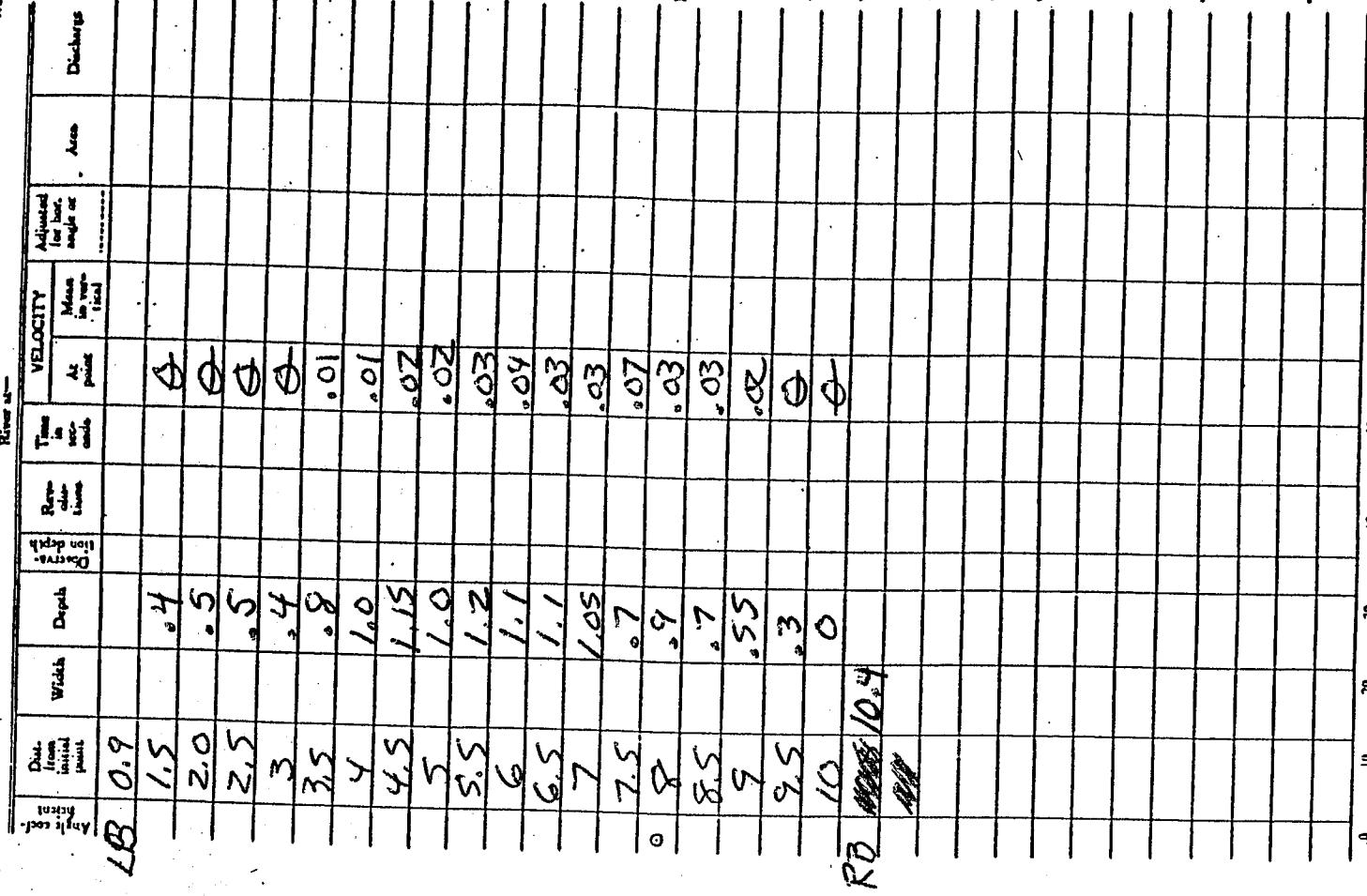
Record removed \_\_\_\_\_ Intake flushed u \_\_\_\_\_

Observer \_\_\_\_\_ Control \_\_\_\_\_

pH 7.59

CONDUCTANCE 141 umhos/cm \_\_\_\_\_

C. H. at zero flow \_\_\_\_\_ ft. 1236 \_\_\_\_\_





WALKER MINE TAILINGS MONITORING PROGRAM

(May 1971)

UNITED STATES

DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

WATER RESOURCES DIVISION

DISCHARGE MEASUREMENT NOTES

Checked by \_\_\_\_\_

Site No. R-6

Sediment Basin Outlet

Date 9/5/71 Party Elfinco

Width Area Vel. C. H. Disch.

Method No. sec. C. H. change in hrs. Sup.

Method coef. Hor. angle coef. Sup. coef. Meter No.

CAGE READINGS

Recorder Inside Outside

Date rated for rod, other.

Meter It. above bottom of weight.

Spin before meas. after

Meas. plots % diff. from rating

Bridge ice, boat, upstr., downstr., side

bridge feet, mile, above, below

base, and

Check-bar, found

changed to at

Correct

Levels obtained

Weather

Indoor check

Air  $^{15} \text{C}$

Water  $^{15} \text{C}$

Intake flushed

Measurement rated excellent (2% error), fair (8%), poor (over 8%). Based on following

conditional cross section

Flow - 4.0 acre

Other

Gage

Observer

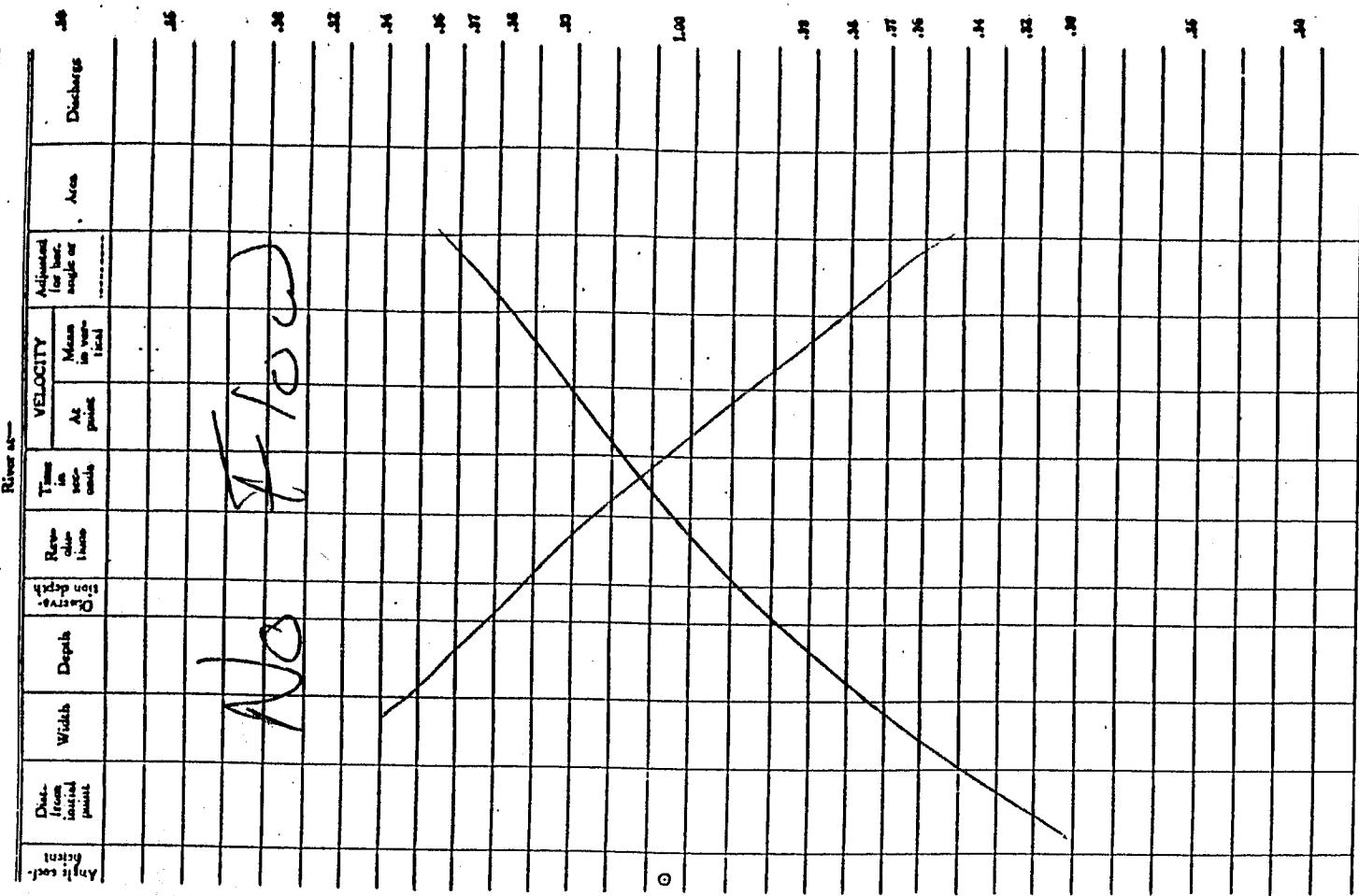
Control

pH

CONDUCTANCE umhos/cm

C. H. of zero flow

No Samples



# 5-00-028

Walter Tailings (Surface water)

Henrici Water Laboratory Chain of Custody

Purveyor: Joe Hoffman  
Attn: Phonics National Forest  
159 Lawrence St  
Quincy, CA 95971      530-283-2051

Surveyor: Attn:		Joe Hoffman			Type of Analyses	Dawn -
		Sierra National Forest 159 Lawrence St Quincy, CA 95971				Results by Thanksgiving, please
Sampler's Signature						Some detection limits.
I.D. No.	Date	Time	Location	No. of samples	Cont. limits	Detection Limits
9/5/69	1528	B-3		1	X X X X X X	Cu: 1 ug/l
	1555	B-4		1	X X X X X X	Zn: 2 ug/l
	1625	B-5		1	X X X X X X	Fe: 50 ug/l
	1723	B-6		1	X X X X X X	
9/5/69	1216	R-2		1	X X X X X X	
	1236	R-4		1	X X X X X X	
	1332	R-3		1	X X X X X X	
	1412	R-1		1	X X X X X X	
	1440	R-5		1	X X X X X X	
Relinquished By		Date	Time	Received By		
<i>Joe Hoffman</i>		9/5/69	1850	DM Hanlon		

**HENRICI WATER LABORATORY**  
1832 BUTTERFLY VALLEY ROAD, QUINCY, CALIFORNIA 95971  
PHONE (530) 281-6588

Plumas National Forest  
Supervisor's Office  
P.O. Box 11500  
Quincy, CA 95971

Account: 11616  
Date: 12/09/04  
Page: 1

ANALYSIS REPORT

Laboratory Number: C36821 Date Received: 09/05/04

Location: Walker Mine R-1

Date of Collection : 09/05/04 Time: 1412 Collector: Flynn

Hardness, Dissolved Copper, Dissolved Iron and Dissolved Zinc analysis by Cal Science, Garden Grove, CA.

Analysis	Date of Analysis	Method	Detection Limits	Results	Units
Total Hardness	12/04/04	EPA 130.2	2	110	mg/L
Total Alkalinity	09/05/04	SM 2320 B	1	65	mg/L
Sulfate	09/17/04	SM 375.4	0.5	9.4	mg/L
Turbidity	09/05/04	SM 2130B	0.05	2.5	NTU
Dissolved Iron	12/03/04	EPA 6020	50.0	176	ug/L
Dissolved Copper	12/03/04	EPA 6020	1.00	7.82	ug/L
Dissolved Zinc	12/03/04	EPA 6020	1.00	<1.00	ug/L

These results were obtained by following standard laboratory procedures: the liability of the laboratory shall not exceed the amount paid for this report

Dawn M. Henton

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Date: 12/09/04  
Page: 1

ANALYSIS REPORT

Laboratory Number: C36822 Date Received: 09/05/04

Location: Walker Mine R-2

Date of Collection : 09/05/04 Time: 1216 Collector: Flynn

Hardness, Dissolved Copper, Dissolved Iron and Dissolved Zinc analysis by Cal Science, Garden Grove, CA.

Analysis	Date of Analysis	Method	Detection Limits	Results	Units
Total Hardness	12/04/04	EPA 130.2	2	120	mg/L
Total Alkalinity	09/05/04	SM 2320 B	1	75	mg/L
Sulfate	09/17/04	SM 375.4	0.5	3.9	mg/L
Turbidity	09/05/04	SM 2130B	0.05	2.6	NTU
Dissolved Iron	12/03/04	EPA 6020	50.0	247	ug/L
Dissolved Copper	12/03/04	EPA 6020	1.0	51.7	ug/L
Dissolved Zinc	12/03/04	EPA 6020	1.00	6.32	ug/L

These results were obtained by following standard laboratory procedures: the liability of the laboratory shall not exceed the amount paid for this report.

Dawn M. Henton

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Account: 11616  
Date: 12/09/04  
Page: 1

ANALYSIS REPORT

Laboratory Number: C36823 Date Received: 09/05/04  
Location: Walker Mine R-3

Date of Collection : 09/05/04 Time: 1332 Collector: Flynn

Hardness, Dissolved Copper, Dissolved Iron and Dissolved Zinc analysis by Cal Science, Garden Grove, CA.

Analysis	Date of Analysis	Method	Detection Limits	Results	Units
Total Hardness	12/04/04	EPA 130.2	2	100	mg/L
Total Alkalinity	09/05/04	SM 2320 B	1	66	mg/L
Sulfate	09/17/04	SM 375.4	0.5	1.6	mg/L
Turbidity	09/05/04	SM 2130B	0.05	1.8	NTU
Dissolved Iron	12/03/04	EPA 6020	50.0	<50.0	ug/L
Dissolved Copper	12/03/04	EPA 6020	1.00	<1.00	ug/L
Dissolved Zinc	12/03/04	EPA 6020	1.00	1.93	ug/L

These results were obtained by following standard laboratory procedures: the liability of the laboratory shall not exceed the amount paid for this report.

Dawn M. Henton  
*Dawn M. Henton*

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Quincy, CA 95971

Account: 11616  
Date: 12/09/04  
Page: 1

ANALYSIS REPORT

Laboratory Number: C36824 Date Received: 09/05/04

Location: Walker Mine R-4

Date of Collection : 09/05/04 Time: 1236 Collector: Flynn

Hardness, Dissolved Copper, Dissolved Iron and Dissolved Zinc analysis by Cal Science, Garden Grove, CA.

Analysis	Date of Analysis	Method	Detection Limits	Results	Units
Total Hardness	12/04/04	EPA 130.2	2	120	mg/L
Total Alkalinity	09/05/04	SM 2320 B	1	75	mg/L
Sulfate	09/17/04	SM 375.4	0.5	17.7	mg/L
Turbidity	09/05/04	SM 2130B	0.05	2.1	NTU
Dissolved Iron	12/03/04	EPA 6020	50.0	91.8	ug/L
Dissolved Copper	12/03/04	EPA 6020	1.00	<1.00	ug/L
Dissolved Zinc	12/03/04	EPA 6020	1.00	<1.00	ug/L

These results were obtained by following standard laboratory procedures: the liability of the laboratory shall not exceed the amount paid for this report.

Dawn M. Henton  
*Dawn*

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Account: 11616  
Date: 12/09/04  
Page: 1

ANALYSIS REPORT

Laboratory Number: C36825 Date Received: 09/05/04

Location: Walker Mine R-5

Date of Collection : 09/05/04 Time: 1440 Collector: Flynn

Hardness, Dissolved Copper, Dissolved Iron and Dissolved Zinc analysis by Cal Science, Garden Grove, CA.

Analysis	Date of Analysis	Method	Detection Limits	Results	Units
Total Hardness	12/04/04	EPA 130.2	2	150	mg/L
Total Alkalinity	09/05/04	SM 2320 B	1	77	mg/L
Sulfate	09/17/04	SM 375.4	0.5	13.0	mg/L
Turbidity	09/05/04	SM 2130B	0.05	1.8	NTU
Dissolved Iron	12/03/04	EPA 6020	50.0	<50.0	ug/L
Dissolved Copper	12/03/04	EPA 6020	1.00	<1.00	ug/L
Dissolved Zinc	12/03/04	EPA 6020	1.00	<1.00	ug/L

These results were obtained by following standard laboratory procedures: the liability of the laboratory shall not exceed the amount paid for this report.

Dawn M. Henton

**SEPTEMBER 2004**

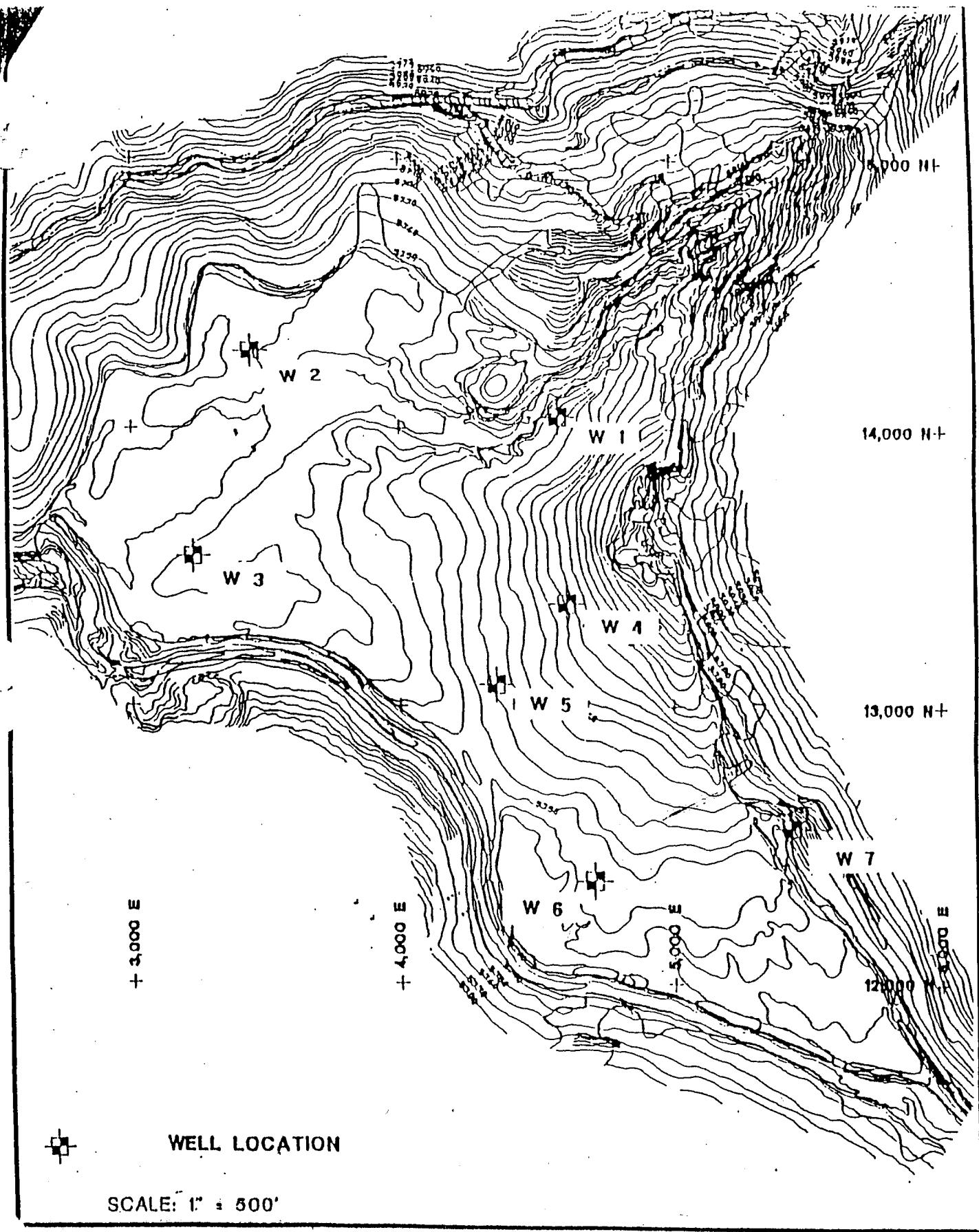
**GROUND WATER TEST RESULTS  
AND  
SUPPORTING DOCUMENTATION**

## Table 2. GROUND WATER SUMMARY

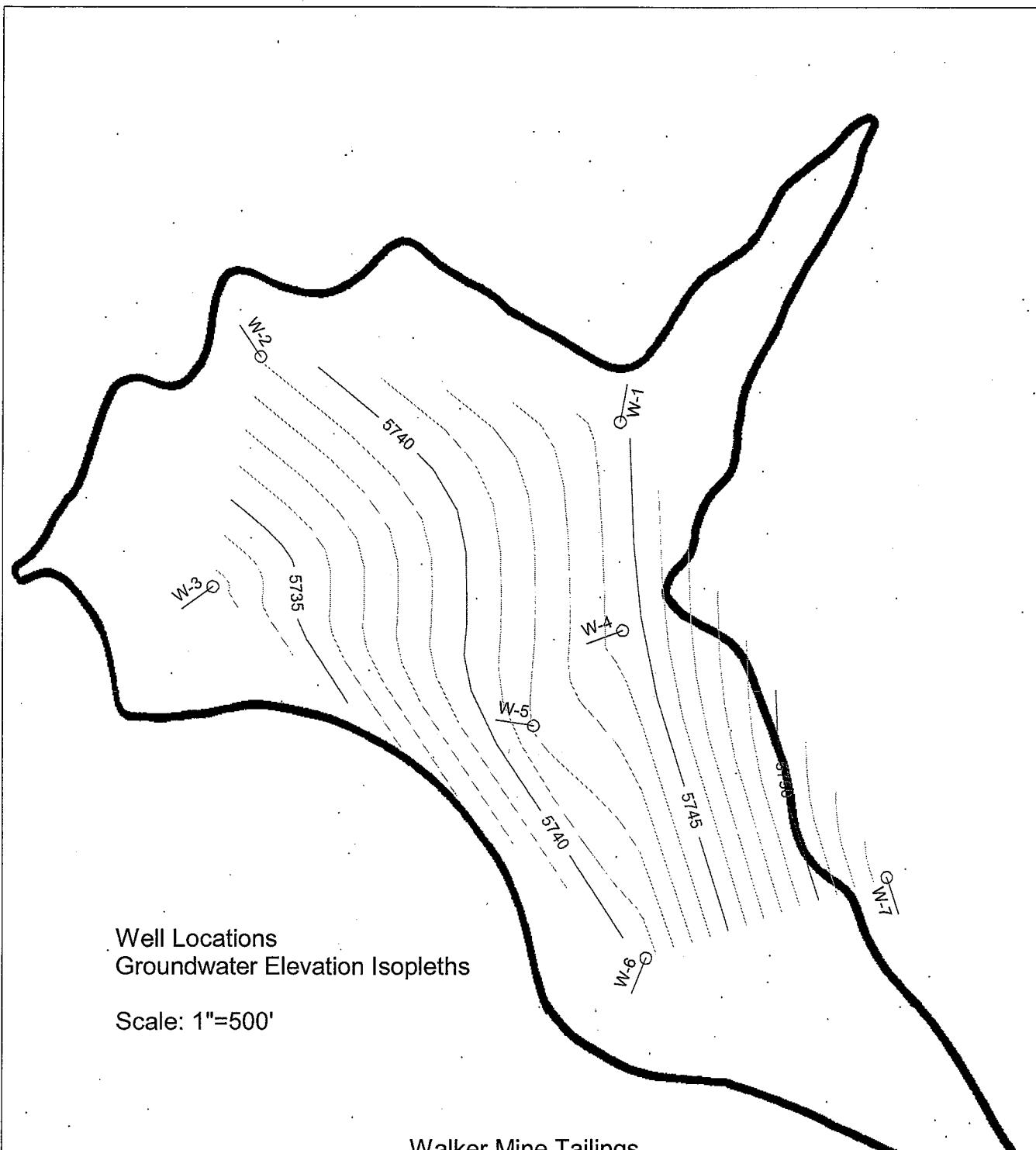
**MONITORING AND REPORTING PROGRAM NO. 5-00-028**  
**U.S. DEPARTMENT OF AGRICULTURE, FOREST SERVICE, PLUMAS NATIONAL FOREST**  
**WALKER MINE TAILINGS, PLUMAS COUNTY**  
**September 2004**

CONSTITUENT	UNIT	DETECTION LIMIT		WELL SITES				W-6	W-7*
		W-1	W-2	W-3	W-4	W-5	W-6		
Field Parameters									
Ground Surface Elevation	ft	0.01	5759.50	5742.05	5739.15	5768.27	5754.28	5748.04	5753.85
Top of Cap Elevation	ft	0.01	5759.24	5741.74	5738.83	5768.00	5754.09	5747.87	5754.91
Depth to Water	ft	0.01	14.57	2.63	6.30	23.52	11.89	7.44	1.20
Water Surface Elevation	ft	0.01	5744.67	5739.11	5732.53	5744.48	5742.20	5740.43	5753.71
Laboratory									
Total Hardness as CaCO <sub>3</sub>	mg/l	2	N/A	N/A	220	N/A	220	N/A	70
Total Alkalinity	mg/l	1	N/A	N/A	102	N/A	36	N/A	45
Sulfate	mg/l	0.5	N/A	N/A	117.5	N/A	207.0	N/A	2.4
Dissolved Iron	ug/l	50.0	N/A	N/A	ND	N/A	ND	N/A	ND
Dissolved Copper	ug/l	1.0	N/A	N/A	2.37	N/A	1.11	N/A	ND
Dissolved Zinc	ug/l	1.0	N/A	N/A	1.56	N/A	ND	N/A	4.87

\*W-7 is located upgradient and off-site in a wet area. The data collected from this well are used for background comparisons.



WALKER MINE TAILINGS



Well Locations  
Groundwater Elevation Isopleths

Scale: 1"=500'

Walker Mine Tailings  
Groundwater Contour Map

September 2004

WALKER TAILINGS GROUNDWATER MONITORING PROGRAM  
FLUID LEVEL GAUGING

SITE LOCATION: Walker Mine DATE: 9-5-04  
COMPANY NAME: USFS  
PERSONNEL: P Flynn

WELL	TIME	DEPTH TO WATER	COMMENTS
W-1	0849	14.57	
2	0834	2.63	
3	0902	6.30	
4	1041	23.52	
5	1000	11.89	
6	1107	7.44	
7	1134	1.20	







Weller Tailing (Ground water)

Henrici Water Laboratory Chain of Custody

Walker Tailing (Ground water) #5-00-028

Henrici Water Laboratory Chain of Custody

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Plumas National Forest  
Supervisor's Office  
P.O. Box 11500  
Quincy, CA 95971

Account: 11616  
Date: 12/09/04  
Page: 1

ANALYSIS REPORT

Laboratory Number: C36826 Date Received: 09/05/04

Location: Walker Mine W-3

Date of Collection : 09/05/04 Time: 1055 Collector: Flynn

Hardness, Dissolved Copper, Dissolved Iron and Dissolved Zinc analysis by Cal Science, Garden Grove, CA.

Analysis	Date of Analysis	Method	Detection Limits	Results	Units
Total Hardness	12/04/04	EPA 130.2	2	220	mg/L
Total Alkalinity	09/05/04	SM 2320 B	1	102	mg/L
Sulfate	09/17/04	SM 375.4	0.5	117.5	mg/L
Dissolved Iron	12/03/04	EPA 6020	50.0	<50.0	ug/L
Dissolved Copper	12/03/04	EPA 6020	1.00	2.37	ug/L
Dissolved Zinc	12/03/04	EPA 6020	1.00	1.56	ug/L

These results were obtained by following standard laboratory procedures: the liability of the laboratory shall not exceed the amount paid for this service.

Dawn M. Henton

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Account: 11616  
Date: 12/09/04  
Page: 1

ANALYSIS REPORT

Laboratory Number: C36827 Date Received: 09/05/04  
Location: Walker Mine W-5  
Date of Collection : 09/05/04 Time: 1118 Collector: Flynn

Hardness, Dissolved Copper, Dissolved Iron and Dissolved Zinc analysis by  
Cal Science, Garden Grove, CA.

Analysis	Date of Analysis	Method	Detection Limits	Results	Units
Total Hardness	12/04/04	EPA 130.2	2	220	mg/L
Total Alkalinity	09/05/04	SM 2320 B	1	36	mg/L
Sulfate	09/17/04	SM 375.4	0.5	207.0	mg/L
Dissolved Iron	12/03/04	EPA 6020	50.0	<50.0	ug/L
Dissolved Copper	12/03/04	EPA 6020	1.00	1.11	ug/L
Dissolved Zinc	12/03/04	EPA 6020	1.00	<1.00	ug/L

These results were obtained by following  
standard laboratory procedures: the liability  
of the laboratory shall not exceed the  
amount paid for this report.

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Date: 12/09/04  
Page: 1

ANALYSIS REPORT

Laboratory Number: C36828 Date Received: 09/05/04

Location: Walker Mine W-7

Date of Collection : 09/05/04 Time: 1312 Collector: Flynn

Hardness, Dissolved Copper, Dissolved Iron and Dissolved Zinc analysis by Cal Science, Garden Grove, CA.

Analysis	Date of Analysis	Method	Detection Limits	Results	Units
Total Hardness	12/04/04	EPA 130.2	2	70	mg/L
Total Alkalinity	09/05/04	SM 2320 B	1	45	mg/L
Sulfate	09/17/04	SM 375.4	0.5	2.4	mg/L
Dissolved Iron	12/03/04	EPA 6020	50.0	<50.0	ug/L
Dissolved Copper	12/03/04	EPA 6020	1.00	<1.00	ug/L
Dissolved Zinc	12/03/04	EPA 6020	1.00	4.87	ug/L

These results were obtained by following standard laboratory procedures: the liability of the laboratory shall not exceed the amount paid for this service.

Dawn M. Henton  
*DMH*